ANSWER KEY

Illinois

Grade 6

ISAT Test Prep

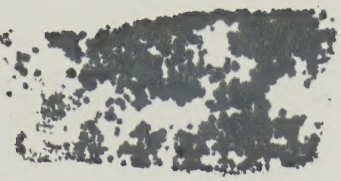
- Item Analysis Charts Align Test Items to Illinois Performance Descriptors
- Answers Include Illinois Science Standards

Coming Soon!
Lesson Plans with **Your State Standards**

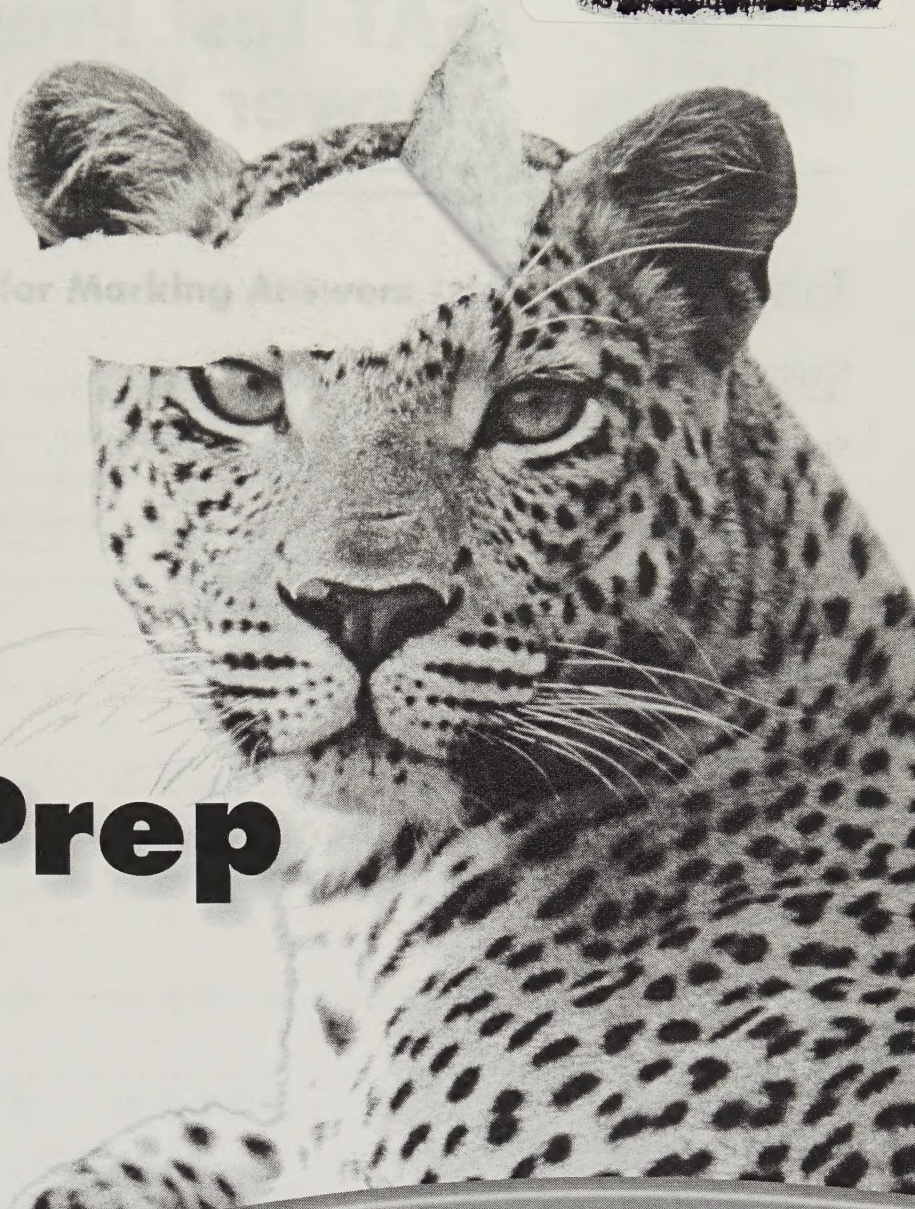
Scott Foresman

Science

learning in a whole new light



Illinois



ISAT Test Prep

ANSWER KEY

Science

PEARSON
Scott Foresman

Editorial Offices: Glenview, Illinois • Parsippany, New Jersey • New York, New York
Sales Offices: Needham, Massachusetts • Duluth, Georgia • Glenview, Illinois
Coppell, Texas • Sacramento, California • Mesa, Arizona

scottforesman.com

ISAT Test Prep Answer Key

Table of Contents

ISBN: 0-328-14756-7

2 3 4 5 6 7 8 9 10 V0KO 12 11 10 09 08 07 06 05

Student Answer Sheet for ISAT Test Prep, Unit A

Name _____

Important Directions for Marking Answers

- Use black lead pencil (No. 2).
- Make heavy dark marks that fill the circle completely.
- Erase completely any answers you wish to change.
- If you erase a grid circle, do not redraw it.
- Do not make any stray marks on this answer sheet.

Correct Mark
Ⓐ ● Ⓒ Ⓓ

Incorrect Marks
Ⓐ Ⓑ Ⓒ Ⓓ

Unit A

1. Ⓐ Ⓑ Ⓒ Ⓓ	6. Ⓐ Ⓑ Ⓒ Ⓓ	11. Ⓐ Ⓑ Ⓒ Ⓓ	16. Ⓐ Ⓑ Ⓒ Ⓓ	21. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	7. Ⓐ Ⓑ Ⓒ Ⓓ	12. Ⓐ Ⓑ Ⓒ Ⓓ	17. Ⓐ Ⓑ Ⓒ Ⓓ	22. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	8. Ⓐ Ⓑ Ⓒ Ⓓ	13. Ⓐ Ⓑ Ⓒ Ⓓ	18. Ⓐ Ⓑ Ⓒ Ⓓ	23. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ	9. Ⓐ Ⓑ Ⓒ Ⓓ	14. Ⓐ Ⓑ Ⓒ Ⓓ	19. Ⓐ Ⓑ Ⓒ Ⓓ	24. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ	10. Ⓐ Ⓑ Ⓒ Ⓓ	15. Ⓐ Ⓑ Ⓒ Ⓓ	20. Ⓐ Ⓑ Ⓒ Ⓓ	25. Ⓐ Ⓑ Ⓒ Ⓓ

Student Answer Sheet for ISAT Test Prep, Unit B

Name _____

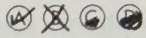
Important Directions for Marking Answers

- Use black lead pencil (No. 2).
- Make heavy dark marks that fill the circle completely.
- Erase completely any answers you wish to change.
- If you erase a grid circle, do not redraw it.
- Do not make any stray marks on this answer sheet.

Correct Mark

Ⓐ ● Ⓒ Ⓓ

Incorrect Marks



Unit B

26. Ⓐ Ⓑ Ⓒ Ⓓ	**31.** Ⓐ Ⓑ Ⓒ Ⓓ	**36.** Ⓐ Ⓑ Ⓒ Ⓓ	**41.** Ⓐ Ⓑ Ⓒ Ⓓ	**46.** Ⓐ Ⓑ Ⓒ Ⓓ
27. Ⓐ Ⓑ Ⓒ Ⓓ	**32.** Ⓐ Ⓑ Ⓒ Ⓓ	**37.** Ⓐ Ⓑ Ⓒ Ⓓ	**42.** Ⓐ Ⓑ Ⓒ Ⓓ	**47.** Ⓐ Ⓑ Ⓒ Ⓓ
28. Ⓐ Ⓑ Ⓒ Ⓓ	**33.** Ⓐ Ⓑ Ⓒ Ⓓ	**38.** Ⓐ Ⓑ Ⓒ Ⓓ	**43.** Ⓐ Ⓑ Ⓒ Ⓓ	**48.** Ⓐ Ⓑ Ⓒ Ⓓ
29. Ⓐ Ⓑ Ⓒ Ⓓ	**34.** Ⓐ Ⓑ Ⓒ Ⓓ	**39.** Ⓐ Ⓑ Ⓒ Ⓓ	**44.** Ⓐ Ⓑ Ⓒ Ⓓ	**49.** Ⓐ Ⓑ Ⓒ Ⓓ
30. Ⓐ Ⓑ Ⓒ Ⓓ	**35.** Ⓐ Ⓑ Ⓒ Ⓓ	**40.** Ⓐ Ⓑ Ⓒ Ⓓ	**45.** Ⓐ Ⓑ Ⓒ Ⓓ	**50.** Ⓐ Ⓑ Ⓒ Ⓓ

Student Answer Sheet for ISAT Test Prep, Unit C

Name _____

Important Directions for Marking Answers

- Use black lead pencil (No. 2).
- Make heavy dark marks that fill the circle completely.
- Erase completely any answers you wish to change.
- If you erase a grid circle, do not redraw it.
- Do not make any stray marks on this answer sheet.

Correct Mark

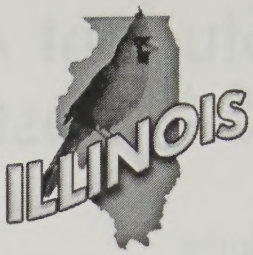
Ⓐ ● Ⓒ Ⓓ

Incorrect Marks

Unit C

51. Ⓐ Ⓑ Ⓒ Ⓓ	**56.** Ⓐ Ⓑ Ⓒ Ⓓ	**61.** Ⓐ Ⓑ Ⓒ Ⓓ	**66.** Ⓐ Ⓑ Ⓒ Ⓓ	**71.** Ⓐ Ⓑ Ⓒ Ⓓ
52. Ⓐ Ⓑ Ⓒ Ⓓ	**57.** Ⓐ Ⓑ Ⓒ Ⓓ	**62.** Ⓐ Ⓑ Ⓒ Ⓓ	**67.** Ⓐ Ⓑ Ⓒ Ⓓ	**72.** Ⓐ Ⓑ Ⓒ Ⓓ
53. Ⓐ Ⓑ Ⓒ Ⓓ	**58.** Ⓐ Ⓑ Ⓒ Ⓓ	**63.** Ⓐ Ⓑ Ⓒ Ⓓ	**68.** Ⓐ Ⓑ Ⓒ Ⓓ	**73.** Ⓐ Ⓑ Ⓒ Ⓓ
54. Ⓐ Ⓑ Ⓒ Ⓓ	**59.** Ⓐ Ⓑ Ⓒ Ⓓ	**64.** Ⓐ Ⓑ Ⓒ Ⓓ	**69.** Ⓐ Ⓑ Ⓒ Ⓓ	**74.** Ⓐ Ⓑ Ⓒ Ⓓ
55. Ⓐ Ⓑ Ⓒ Ⓓ	**60.** Ⓐ Ⓑ Ⓒ Ⓓ	**65.** Ⓐ Ⓑ Ⓒ Ⓓ	**70.** Ⓐ Ⓑ Ⓒ Ⓓ	**75.** Ⓐ Ⓑ Ⓒ Ⓓ

Student Answer Sheet for ISAT Test Prep, Unit D



Name _____

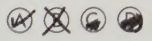
Important Directions for Marking Answers

- Use black lead pencil (No. 2).
- Make heavy dark marks that fill the circle completely.
- Erase completely any answers you wish to change.
- If you erase a grid circle, do not redraw it.
- Do not make any stray marks on this answer sheet.

Correct Mark

Ⓐ ● Ⓒ Ⓓ

Incorrect Marks



Unit D

76. Ⓐ Ⓑ Ⓒ Ⓓ	**81.** Ⓐ Ⓑ Ⓒ Ⓓ	**86.** Ⓐ Ⓑ Ⓒ Ⓓ	**91.** Ⓐ Ⓑ Ⓒ Ⓓ	**96.** Ⓐ Ⓑ Ⓒ Ⓓ
77. Ⓐ Ⓑ Ⓒ Ⓓ	**82.** Ⓐ Ⓑ Ⓒ Ⓓ	**87.** Ⓐ Ⓑ Ⓒ Ⓓ	**92.** Ⓐ Ⓑ Ⓒ Ⓓ	**97.** Ⓐ Ⓑ Ⓒ Ⓓ
78. Ⓐ Ⓑ Ⓒ Ⓓ	**83.** Ⓐ Ⓑ Ⓒ Ⓓ	**88.** Ⓐ Ⓑ Ⓒ Ⓓ	**93.** Ⓐ Ⓑ Ⓒ Ⓓ	**98.** Ⓐ Ⓑ Ⓒ Ⓓ
79. Ⓐ Ⓑ Ⓒ Ⓓ	**84.** Ⓐ Ⓑ Ⓒ Ⓓ	**89.** Ⓐ Ⓑ Ⓒ Ⓓ	**94.** Ⓐ Ⓑ Ⓒ Ⓓ	**99.** Ⓐ Ⓑ Ⓒ Ⓓ
80. Ⓐ Ⓑ Ⓒ Ⓓ	**85.** Ⓐ Ⓑ Ⓒ Ⓓ	**90.** Ⓐ Ⓑ Ⓒ Ⓓ	**95.** Ⓐ Ⓑ Ⓒ Ⓓ	**100.** Ⓐ Ⓑ Ⓒ Ⓓ

ISAT Test Prep, Unit A

Directions: Choose the best answer for each question. Then mark your answer on your answer sheet.

1 **Which major body systems work together MOST closely to remove wastes from the human body?**

A. Circulatory, digestive, endocrine, excretory

B. Digestive, excretory, muscular, respiratory

C. Circulatory, digestive, excretory, respiratory

D. Digestive, excretory, respiratory, skeletal

2 **Gabrielle is presenting a science report to the class. She states that plants do not need oxygen. What should Gabrielle have said?**

A. Plants use oxygen to break down food.

B. Plants use oxygen to store extra glucose.

C. Oxygen is poisonous to plants.

D. Gabrielle's statement is correct.

Use the table to answer Questions 3 and 4.

	Nucleus	Cell Wall	Chlorophyll
Cell A	No	Yes	Yes
Cell B	Yes	No	No
Cell C	Yes	Yes	Yes
Cell D	Yes	Yes	No

3 **Which cell can you infer is a plant cell?**

A. Cell A

B. Cell C

C. Cell A and Cell C

D. Cell C and Cell D

4 **Which cell can you infer is an animal cell?**

A. Cell B

B. Cell D

C. Cell B and Cell D

D. Cell A and Cell C

5 **Which describes a biotic factor in frogs' environments?**

A. Frogs eat mosquitoes and tiny fish.

B. Frogs live near ponds.

C. Frogs survive winter by hibernating.

D. Frogs sit on rocks in the pond.

6 **In guinea pigs, black fur color (B) is dominant. White fur color (b) is recessive. Suppose a hybrid black guinea pig mates with a purebred white guinea pig. What is the MOST LIKELY prediction you can make about the appearance of the offspring?**

White Guinea Pig	Black Guinea Pig: B	Black Guinea Pig: b
b	Bb	bb
b	Bb	bb

A. 100% will be black because black is dominant.

B. 100% will be white because each will carry a recessive gene.

C. 50% will be black, and 50% will be white.

D. 50% will be black and white, and 50% will be white.

7 **What makes up most of a cell?**

A. Water

B. Chromosomes

C. The nucleus

D. Nutrients

8 **Suppose pathogens enter a cut on your skin. Which body systems work together to bring white blood cells to the area?**

A. Circulatory and muscular

B. Circulatory and nervous

C. Circulatory and immune

D. Endocrine and immune

9 **Which of the following is NOT a biofeedback loop that keeps the human body in balance?**

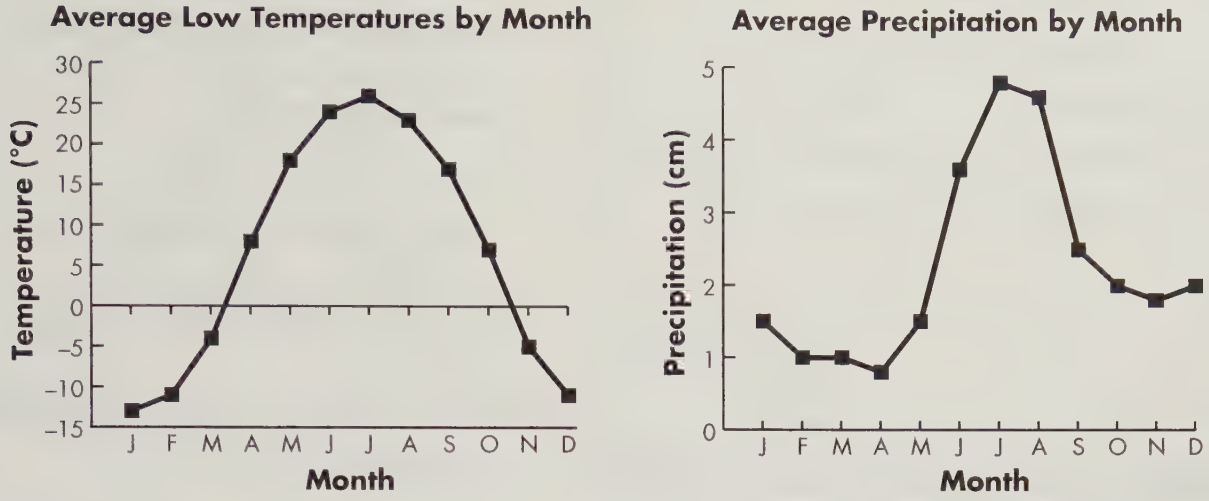
A. You see your favorite candy, so your mouth produces more saliva.

B. Your body needs water, so you feel thirsty.

C. You feel hot, so you start sweating.

D. Your blood glucose drops, so your body releases stored glucose.

The graphs show average precipitation and temperature by month for a particular city.



10 **During which three months is the average precipitation the lowest?**

A. February, March, April

B. December, January, February

C. January, February, March

D. June, July, August

11 **What describes the relationship between temperature and precipitation for most months?**

A. As the temperature rose, precipitation remained the same.

B. As the temperature rose, precipitation dropped.

C. As the temperature dropped, precipitation dropped.

D. As the temperature dropped, precipitation remained the same.

12 **What kind of muscle tissue is found in the stomach?**

A. Skeletal

B. Smooth

C. Cardiac

D. Voluntary

13 **What happens FIRST when a cell divides?**

A. The cytoplasm divides.

B. Chromosomes line up.

C. The cell copies its DNA.

D. Chromosomes uncoil.

14 **Fertilization in seed plants occurs in steps. What is the next step AFTER sperm cells travel down the pollen tubes to the ovules?**

A. Fertilization occurs.

B. The sperm cells produce more male sex cells.

C. The ovule forms a seed.

D. The stamen begins to produce pollen.

15 **A salt marsh has hawks that feed on mice. Herons feed on fish. The fish and mice feed on insects and grasses. The insects feed on algae. Which statement is TRUE?**

A. Algae and grasses are hosts.

B. Hawks, herons, fish, mice, and insects are consumers.

C. Mice, fish, insects, grasses, and algae are producers.

D. Hawks, herons, fish, mice, and insects are predators.

16 **How are plants and animals DIFFERENT?**

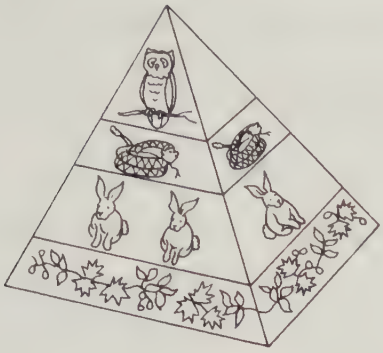
A. Plants cannot move, but animals can.

B. Plants do not reproduce sexually, but animals do.

C. Plants and animals break down food in different ways.

D. Plants and animals obtain food in different ways.

Use the picture to answer Questions 17 and 18.



17 **What is the source of the energy in the energy pyramid?**

A. The Sun

B. The owl

C. The plants

D. The source cannot be determined from this picture.

18 **Humans are cutting down many trees in the area to build homes. What do you predict will happen to the organisms shown in the pyramid?**

A. The numbers of organisms will stay the same but live in a smaller area.

B. Only the rabbit population will decrease because its food supply of plants will decrease.

C. Only the owl population will decrease because owls live in trees.

D. All of these populations will decrease because they are losing part of their place to live.

19 **Bacteria are DIFFERENT from plants and animals because bacteria**

A. are limited in where they can live.

B. lack a nucleus.

C. lack chlorophyll.

D. reproduce asexually.

20 **What does it mean for animals to be the same species?**

A. They share some characteristics.

B. They have similar adaptations.

C. They mate with one another and produce fertile offspring.

D. They live in the same place.

21 **Which statement BEST summarizes the work of Schleiden and Schwann?**

A. Plants and animals are multicellular.

B. Plants are made of cells.

C. Animals are made of cells.

D. Plants and animals are made of cells.

Use the information in the box to answer Questions 22 and 23.

> Jeremy gives different amounts of fertilizer to different tomato plants. He keeps the amount of water and sunlight the same for all plants. Once a week, he measures how much each plant grew.

22 **What is Jeremy's hypothesis?**

A. Fertilizer helps plants grow faster.

B. As the amount of fertilizer increases, the plants will grow better.

C. As the amount of fertilizer increases, the number of tomatoes will increase.

D. As the amount of fertilizer increases, the rate of plant growth will increase.

23 **What is the dependent variable?**

A. Type of plant

B. Amount of fertilizer

C. Amount the plants grew

D. Amount of water

24 **Shanika is recording in her science journal the different populations she observes near a pond. Which description is the most scientifically accurate?**

A. I observed several green frogs.

B. I observed several frogs that were making a lot of noise.

C. I observed 7 small green frogs close to the pond.

D. I observed 7 small green frogs, who liked to sit on rocks.

25 **Victor is playing soccer. He kicks the ball to the goalie. What caused his leg bones to move?**

A. Involuntary muscles received messages from his nervous system.

B. Skeletal muscles contracted to pull on his bones.

C. His knee joints moved like a hinge to bend and straighten.

D. Reflex action caused his knee to bend.

ISAT Test Prep, Unit B

Directions: Choose the best answer for each question.
Then mark your answer on your answer sheet.

26 **Hurricanes form over**

A. warm ocean water.
B. cold ocean water.
C. warm land areas.
D. cold land areas.

27 **Earth can BEST be described as a rocky sphere surrounded by**

A. thin layers of water and air.
B. thick layers of water and rock.
C. a thin crust and a thin mantle.
D. a thick crust and a thin mantle.

28 **The BEST way to see a mineral's true color is to rub it against**

A. a smooth piece of brick.
B. an unglazed piece of ceramic tile.
C. a smooth piece of cement.
D. a flat piece of glass.

29 **The force that causes magma to erupt at the surface of the Earth is provided by**

A. colliding plates.
B. gases under pressure.
C. the shape of the volcano.
D. heat.

30 **Which of the following can cause physical AND chemical weathering?**

A. Water
B. Minerals
C. Oxygen
D. Soil

31 **About what percentage of Earth's water supply consists of fresh water?**

A. 3 percent

B. 10 percent

C. 53 percent

D. 70 percent

32 **Small ridges of rocks dot the northeastern part of Illinois, near the shores of Lake Michigan. Lake Michigan is one of the Great Lakes. These ridges formed as**

A. water from the Great Lakes froze to form glaciers.

B. water deposited sand into the Great Lakes.

C. glaciers dropped some of the rocks they were carrying.

D. glaciers eroded the land over which they were moving.

33 **Which is an effect of colliding tectonic plates?**

A. Hurricanes

B. Earthquakes

C. Weathering

D. Evaporation

34 **Alfred Wegener's idea of continental drift was rejected by many scientists of the time because he could not explain how**

A. plants adapted to warm climates grew in cold regions.

B. the same fossils were found on different continents.

C. the continents seemed to have changed positions.

D. similar rocks were found on different continents.

35 **Which action will help prevent minerals from being used up?**

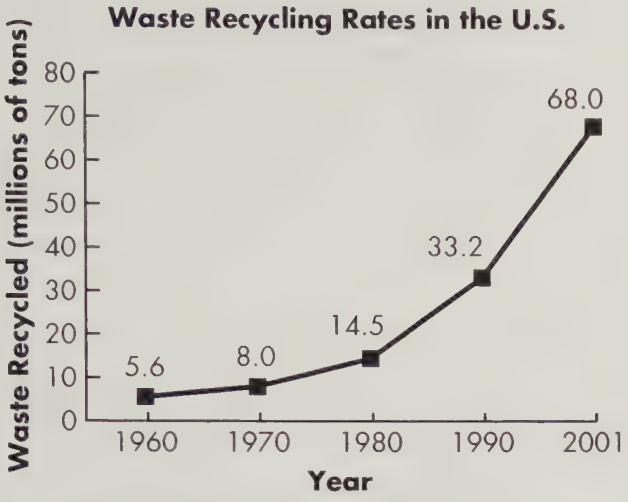
A. Use minerals at a much faster rate than usual.

B. Make mineral substitutes.

C. Collect minerals at a faster rate.

D. Stop recycling efforts.

Use the graph to answer Questions 36 and 37.



Source: U.S. Environmental Protection Agency

36 **The graph shows the amount of trash that was recycled for different years. About how much MORE trash was recycled in 2001 than in 1990?**

- **A.** Three times as much
- **B.** Twice as much
- **C.** One-fourth as much
- **D.** One-fifth as much

37 **Which statement describes the future trend in recycling?**

- **A.** More waste will be recycled.
- **B.** Less waste will be recycled.
- **C.** Recycling will level off.
- **D.** The trend cannot be predicted based on this graph.

38 **The Gulf Stream affects climate by carrying**

- **A.** cool water from the equator toward the Poles.
- **B.** warm water from the equator toward the Poles.
- **C.** cool water from the Poles toward the equator.
- **D.** warm water from the Poles toward the equator.

39 **The energy released during an earthquake moves from**

- **A.** the epicenter to the focus.
- **B.** the focus to all directions.
- **C.** the crust to the core.
- **D.** the atmosphere to the lithosphere.

Use the information in the box to answer Questions 40–42.

Luis is doing an experiment to see how the degree of slope affects the amount of sediment eroded by moving water. He builds a model river in a box lined with plastic. He uses slightly damp sand to form the sides and bottom of the riverbed. Luis can change the degree of slope by raising or lowering the height of one end of the box. For each trial, Luis will add 500 milliliters of water to the top of the model river with a piece of rubber tubing. He will then collect the sand that is eroded, let it dry, and measure it.

40 **What is Luis's hypothesis?**

A. As the slope increases, the amount of sediment eroded will increase.

B. If the rubber tube is too small, the water will not flow through it.

C. If the box is filled to the top with sand, the sand will overflow.

D. If too much water is used, the sand will get muddy.

41 **What is the dependent variable?**

A. Amount of sand eroded

B. Slope of model river

C. Size of the box

D. Amount of water put in tubing

42 **To gather appropriate data, Luis should conduct**

A. one trial with a flat river.

B. ten trials with the same slope.

C. two trials with five different slopes.

D. one trial with ten different slopes.

43 **The table shows SOME of Luis's results. What can Luis conclude?**

Amount of Sediment Eroded (g)

Steepness of Slope (degrees)	Trial 1	Trial 2
10	21	23
20	30	34
30	42	46

A. As slope increases, erosion decreases.

B. As slope increases, erosion increases.

C. The trials cannot be compared because the numbers are too different.

D. The numbers in one of the trials are incorrect.

When large areas of forest are cut down, the habitats of organisms that live in the forest are destroyed. The cleared area is also easily eroded. During heavy rains, topsoil from the cleared area is washed into rivers. The increase in sediment in the water reduces the quality of water. This causes some of the organisms in the rivers to die.

44 **What is the main idea of the paragraph above?**

A. Clearing forests can affect not only organisms that live there but also organisms that live outside the forests.

B. Clearing forests affects organisms in the forest.

C. Clearing large areas of forest can lead to erosion.

D. Human activities can lead to loss of habitat.

45 **Diamond is DIFFERENT from talc because diamond**

A. is a mineral.

B. is made of crystals.

C. is nonliving.

D. has a hardness of 10.

46 **Tidal energy is NOT used worldwide because**

A. only about 70 percent of Earth's surface is covered by water.

B. only a few coastlines have large changes in tides needed for tidal energy.

C. tides form only in bodies of fresh water.

D. tides are a nonrenewable resource.

47 **What type of weather condition usually results when a cold front moves through an area?**

A. Heavy rain

B. Light drizzle

C. Clear, sunny skies

D. Fog

Use the chart to answer Questions 48–50.

Illinois Greenhouse Gas Emissions 1900–2000						
Gas	**1990**	**1992**	**1994**	**1996**	**1998**	**2000**
Carbon dioxide	196.8	196.6	219.9	230.6	215.0	227.3
Methane	26.1	23.7	25.6	23.3	21.3	21.5
Nitrous oxide	7.2	7.5	7.2	7.6	7.8	8.0
Total	230.1	227.7	252.6	261.5	244.1	256.8

Source: Illinois Department of Natural Resources

48 **The chart shows the amount of greenhouse gas emissions in Illinois in metric tons. How did the total levels of emissions change over the period shown?**

A. They decreased in 1992, then rose steadily.

B. They rose steadily every two years.

C. They decreased overall.

D. They increased overall.

49 **What would explain the changes in emissions in Illinois from 1990–2000?**

A. Residents used fewer fossil fuels than usual.

B. Winters were colder than normal.

C. More people started carpooling and riding bikes.

D. Nuclear plants provided more energy than usual for residents.

50 **Greenhouse gas emissions in Illinois might be reduced in the future by**

A. using more petroleum products.

B. clearing more forests and wetlands.

C. using fewer fossil fuels.

D. burning more of Illinois's coal reserves.

ISAT Test Prep, Unit C

Directions: Choose the best answer for each question. Then mark your answer on your answer sheet.

51 **The table shows Jasmine's running times for the 100 meter dash. What is her average speed for the four races?**

Race	Time (sec)
1	15
2	11.25
3	12.5
4	13.25

A. 0.13 m/s
B. 7.8 m/s
C. 13.0 m/s
D. 26.0 m/s

52 **Elena notices that when light passes through a prism, she can see the colors of the rainbow. This happens because the white light is**

A. refracted.
B. reflected.
C. absorbed.
D. magnified.

53 **How does energy change form as it flows from the generator through an electrical circuit to a light bulb?**

A. Electrical → thermal → radiant
B. Thermal → electrical → radiant
C. Mechanical → electrical → chemical
D. Mechanical → electrical → radiant

54 **Charlotte leaves a spoon sitting in a cup of hot chocolate. After a few minutes, the spoon handle is hot. The type of heat transfer that has taken place is**

A. radiation.
B. convection.
C. conduction.
D. insulation.

55 **Each of the metals listed in the table below has the same volume but a different mass. Which statement BEST describes how this is possible?**

	Mass (g)	Volume (cm^3)
Gold	57.96	3
Zinc	21.42	3
Nickel	26.73	3

A. The mass of an object depends on the amount of the pull of gravity on the object.

B. The mass of an object depends on the object's shape.

C. The matter in each metal is packed more tightly or less tightly compared to the other metals.

D. The matter in each of the metals changes as the density of the metal changes.

56 **James ate a bowl of cereal and a banana for breakfast. What type of energy change took place in James' body to allow him to do his everyday activities?**

A. Kinetic to thermal

B. Chemical to kinetic

C. Potential to mechanical

D. Mechanical to chemical

57 **Water is being heated in a pan to its boiling point. What is the sequence of events that occurs in the particles of water?**

A. They slow down, gain energy, and change to a gas.

B. They gain energy, slow down, and remain in liquid form.

C. They gain energy, speed up, and change to a gas.

D. They speed up, gain energy, and become a solid.

58 **How are elements and compounds ALIKE?**

A. Both can be separated into simpler substances.

B. Both are made up of only one kind of atom.

C. A compound has the same properties as the elements that form it.

D. Each element in a compound has the same number of protons as the element by itself.

Use the table to answer Questions 59 and 60.

Pan	Water Temperature (°C)
A	98
B	100
C	96
D	92

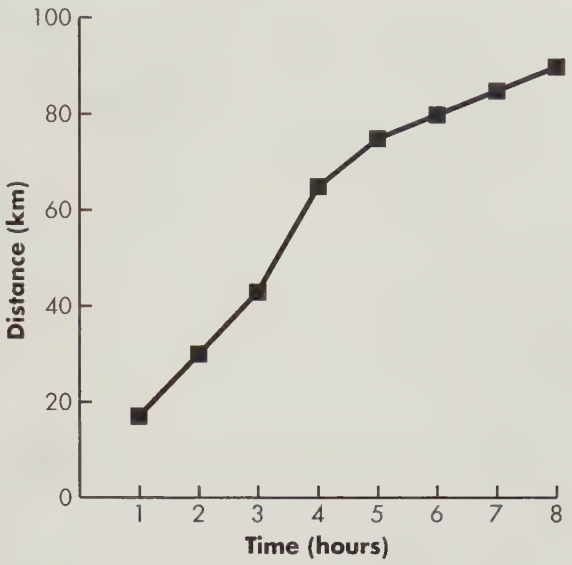
59 **Carlos heated four pans containing equal amounts of water to different temperatures. Which pan had the MOST thermal energy?**

A. Pan A
B. Pan B
C. Pan C
D. Pan D

60 **In which pan does the state of matter of the water change?**

A. Pan A
B. Pan B
C. Pan C
D. Pan D

The graph shows the distance a cyclist traveled in 8 hours. Use the graph to answer Questions 61 and 62.



61 **Between which two hours of the trip is the cyclist's speed the fastest?**

A. Hour 1 and hour 2
B. Hour 2 and hour 3
C. Hour 3 and hour 4
D. Hour 5 and hour 6

62 **Suppose the cyclist is on a straight pathway. What happens to the cyclist's acceleration during the last three hours of the trip?**

A. There is zero acceleration.
B. Acceleration increases.
C. Acceleration increases, then decreases.
D. Acceleration decreases, then increases.

63 **In the lab, Deshawn determines that an unknown substance is made of sand and water. When the substance sits without being stirred, the sand settles to the bottom, separating from the water. What type of substance does Deshawn have?**

A. A compound

B. A mixture

C. A solution

D. An element

64 **Andre is opening a paint can. He places the edge of a screwdriver just beneath the lip of the lid on the can. When he presses down on the handle of the screwdriver, the lid of the paint can lifts up. What simple machine is Andre using?**

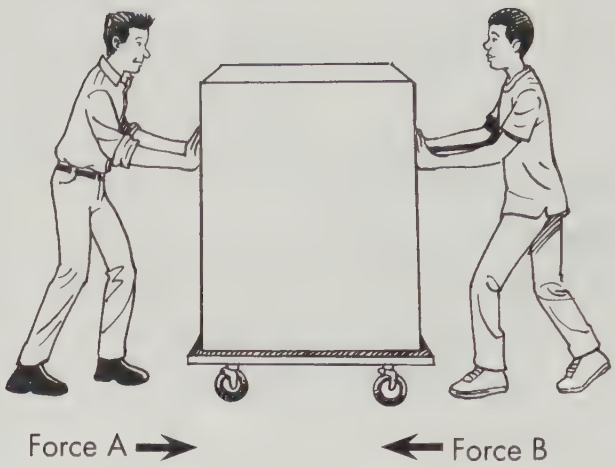
A. A screw

B. A pulley

C. A wedge

D. A lever

65 **Force A is equal to 5 N. Force B is equal to 3 N. What do you predict will happen to the box?**



A. The box will not move because the forces cancel each other.

B. The box will move to the right.

C. The box will move to the left.

D. The box will be lifted off the floor by the combination of forces.

66 **Shelia walks 3 km in 30 minutes. What is the BEST way to express her speed?**

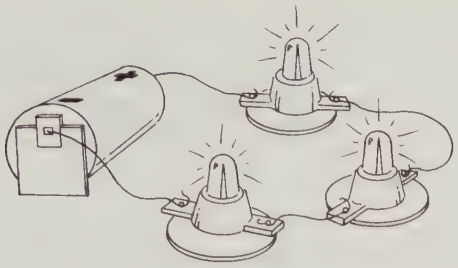
A. 6 km/hr

B. 100 m/min

C. 200 m/2 min

D. 6,000 m/hr

67 **How does current flow through this circuit?**



A. Current flows from the positive side of the battery through each of the bulbs and back to the negative side of the battery.

B. Current flows from the negative side of the battery through each of the bulbs and back to the positive side of the battery.

C. Current flows from the negative side of the battery to the positive side of the battery, then through each of the bulbs.

D. Current flows from the positive side of the battery to the negative side of the battery, then through each of the bulbs.

68 **Sound waves move through**

A. matter in all directions.

B. empty space in all directions.

C. liquids in one direction.

D. air in one direction.

69 **What type of friction acts on a bowling ball as it travels toward the pins?**

A. Static

B. Sliding

C. Rolling

D. Thermal

70 **How are light energy and sound energy ALIKE?**

A. Both travel slowest through solids.

B. Both can travel through empty space.

C. Both travel as waves.

D. Both result from the movement of electrons.

71 **Ashley pushes a box up a ramp on the back of a truck. The inclined plane**

A. causes less work to be done.

B. causes more work to be done.

C. allows the same amount of work to be done over a smaller distance.

D. allows the same amount of work to be done over a greater distance.

Use the table to answer Questions 72 and 73.

Trial Number	Ramp Height (m)	Speed of Toy Cars (m/s)
1	0.6	0.5
2	1.0	0.9
3	1.4	1.1
4	1.9	1.5

72 **The table shows the speed of a toy car that was rolled down ramps of different heights. How could the investigation be changed to make the speed even faster in Trial 5?**

A. Increase the length of the ramp.
B. Decrease the length of the ramp.
C. Increase the height of the ramp.
D. Decrease the height of the ramp.

73 **What is the best way to display the data in the chart?**

A. A line graph
B. A circle graph
C. A stem and leaf plot
D. A double bar graph

Use the information in the box to answer Questions 74 and 75.

Alejandra tests four materials to find out which one is the best insulator. She wraps the same size piece of material around each of four identical bottles. She fills each bottle with 100 ml of water heated to 85°C. She places the bottles in the refrigerator for one hour. Then she measures the temperature in each bottle.

74 **The independent variable in this experiment is the**

A. size of the insulating material.
B. kind of insulating material.
C. temperature of the water after heating.
D. temperature of the water after cooling.

75 **The bottle that has the best insulation is the one in which**

A. the water temperature is highest.
B. the water temperature is lowest.
C. the insulating material is warmest.
D. the insulating material is thickest.

ISAT Test Prep, Unit D

Directions: Choose the best answer for each question. Then mark your answer on your answer sheet.

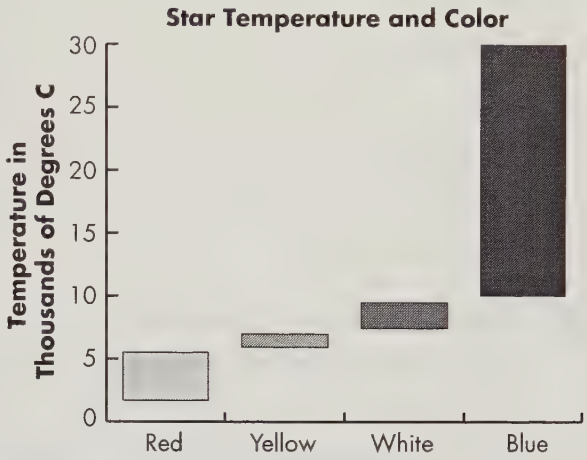
76 **What season is occurring in the northern half of Earth?**

A. Spring
B. Summer
C. Fall
D. Winter

77 **What causes the "new Moon" phase of the Moon?**

A. Earth is between the Sun and the Moon.
B. The Moon blocks the light of the Sun.
C. The unlighted side of the Moon faces Earth.
D. The lighted side of the Moon faces Earth.

Use the graph to answer Questions 78 and 79.



78 **What color is a star at 8,300°C?**

A. Red
B. Yellow
C. White
D. Blue

79 **How much hotter is the coolest blue star than the coolest red star?**

A. 2 times hotter
B. 5 times hotter
C. 10 times hotter
D. 15 times hotter

80 **The diagram below shows the relative positions of Earth, the Moon, and the Sun at a particular time. Which phase of the Moon would people see from Earth?**

Sun —— Earth —— Moon

A. Full Moon
B. First quarter
C. New Moon
D. Third quarter

81 **During the winter Lisa could see all the stars in a particular constellation. However, during the summer she could see only some of the stars. Why?**

A. The stars changed position.
B. Earth is moving.
C. The stars shine brighter in winter.
D. Some of the stars died out.

Use the information in the box to answer Questions 82 and 83.

> Mrs. Sanchez's class is playing a game called "Mystery Planet." Planet A has a rocky surface and is very hot. Its atmosphere is mostly carbon dioxide. Planet B is composed of hydrogen and helium gases. It is green and very cold.

82 **Which planet can the class conclude is Planet A?**

A. Mercury
B. Venus
C. Mars
D. Pluto

83 **Which planet can the class conclude is Planet B?**

A. Saturn
B. Uranus
C. Neptune
D. Pluto

84 **Which two planets have the strongest force of gravity?**

Planet	Diameter (km)
Mercury	4,879
Venus	12,104
Earth	12,756
Mars	6,794
Jupiter	142,984
Saturn	120,536
Uranus	51,118
Neptune	49,528
Pluto	2,390

A. Mercury and Pluto

B. Venus and Earth

C. Jupiter and Saturn

D. Uranus and Neptune

85 **When the northern half of Earth is tilted toward the Sun,**

A. the angle of the Sun's rays at noon is large.

B. Earth is closest to the Sun in its orbit.

C. it is summer in the southern half.

D. it is summer in the northern half.

86 **Shen is reading a paragraph about life on Earth. The main idea is that living things on Earth could not exist without energy from the Sun. Which detail does NOT support the main idea?**

A. Heat energy from the Sun provides a comfortable temperature on Earth.

B. Like living things, the Sun will eventually die.

C. Plants use light energy from the Sun to make food.

D. The Sun releases light and heat energy by reactions in its core.

87 **What is the safest way to observe a solar eclipse?**

A. Look directly at the eclipse for only a few seconds at a time.

B. Stay inside and view the eclipse through a window.

C. View the eclipse through binoculars.

D. Look at the image the eclipse produces on a piece of cardboard.

Robotic devices collect data at the bottom of the ocean. Some robots survey volcanoes by climbing into them. Robots called rovers collect information on the surface of Mars. A robot was sent to capture close-up pictures and a sample of particles from a comet.

88 **What is the main idea of the paragraph above?**

A. All robots are used to explore.

B. Robots are machines that collect data.

C. Robots go to places that are difficult for humans to visit.

D. Some robots do not need to be programmed by humans.

89 **The Sun is the largest star we see from Earth because**

A. the Sun is a giant star in its life cycle.

B. the Sun has the highest temperature a star can have.

C. the absolute magnitude of the Sun is higher than other stars.

D. the apparent magnitude of the Sun is higher than other stars.

90 **What causes day and night on Earth?**

A. Earth's revolution around the Sun

B. Earth's rotation around its own axis

C. Earth's tilted axis

D. Earth's elliptical orbit around the Sun

91 **A star that has lost its outer, gaseous layers but still has a hot core is a**

A. white dwarf.

B. black dwarf.

C. super giant.

D. red giant.

92 **What causes Earth's seasons?**

A. Earth is closer to the Sun during certain times of the year than others.

B. Earth rotates around its own axis.

C. Earth is tilted on its own axis.

D. Earth orbits the Sun once a year.

93 **The planets in the table below are listed in order of their distances from the Sun. What pattern can you see from studying the data?**

Planet	Period of Revolution	Period of Rotation
Mercury	88 days	1,416 hours
Venus	225 days	5,832 hours
Earth	365 days	24 hours
Mars	687 days	25 hours
Jupiter	12 years	10 hours

A. The shorter one revolution is, the shorter one rotation.

B. The longer one revolution is, the shorter one rotation.

C. The farther a planet is from the Sun, the shorter its rotation.

D. There is no regular pattern between revolution and rotation.

94 **How is Venus DIFFERENT from Jupiter?**

A. Venus is larger in size.

B. Venus is farther from the Sun.

C. Venus has no atmosphere.

D. Venus's surface is rocky.

Use the information in the box to answer Questions 95 and 96.

A team of scientists has designed four different robots labeled A, B, C, and D. The team tests the number of boxes each robot can pack as the boxes move on conveyor belts. Each robot works at a separate conveyor belt. The boxes are the same, and the belts move at the same speed.

95 **What is the best way for the scientists to show the number of boxes each robot packed?**

A. Written description

B. Circle graph

C. Bar graph

D. Line graph

96 **What independent variable are the scientists testing?**

A. The speed of the conveyor belt

B. The number of boxes packed

C. The robot design

D. The time to pack boxes

97 **Nanotechnology may be used in medicine to do all of the following EXCEPT**

A. analyze DNA.

B. deliver cancer drugs inside the body.

C. carry supplies and medicines.

D. detect biological agents.

98 **Which is the BEST unit to use when describing distances between planets in our solar system?**

A. Kilometers

B. Light-years

C. Astronomical units

D. Astronomical kilometers

99 **Which of the following describes Earth's place in the universe from SMALLEST to LARGEST grouping?**

A. Solar system, moons, inner planet, universe

B. Inner planet, solar system, universe, galaxy

C. Inner planet, solar system, galaxy, universe

D. Inner planet, asteroid belt, solar system, galaxy

100 **What event can occur when Earth, the Moon, and the Sun are lined up as shown below?**

Moon ▬ Earth ▬ Sun

A. Solar eclipse

B. Lunar eclipse

C. First quarter Moon

D. Third quarter Moon

ISAT Test Prep Answer Key

Unit A Test

1. Ⓐ Ⓑ ● Ⓓ	6. Ⓐ Ⓑ ● Ⓓ	11. Ⓐ Ⓑ ● Ⓓ	16. Ⓐ Ⓑ Ⓒ ●	21. Ⓐ Ⓑ Ⓒ ●
2. Ⓐ Ⓑ Ⓒ ●	7. ● Ⓑ Ⓒ Ⓓ	12. Ⓐ ● Ⓒ Ⓓ	17. ● Ⓑ Ⓒ Ⓓ	22. Ⓐ Ⓑ Ⓒ ●
3. Ⓐ ● Ⓒ Ⓓ	8. Ⓐ Ⓑ ● Ⓓ	13. Ⓐ Ⓑ ● Ⓓ	18. Ⓐ Ⓑ Ⓒ ●	23. Ⓐ Ⓑ ● Ⓓ
4. ● Ⓑ Ⓒ Ⓓ	9. ● Ⓑ Ⓒ Ⓓ	14. ● Ⓑ Ⓒ Ⓓ	19. Ⓐ ● Ⓒ Ⓓ	24. Ⓐ Ⓑ ● Ⓓ
5. ● Ⓑ Ⓒ Ⓓ	10. ● Ⓑ Ⓒ Ⓓ	15. Ⓐ ● Ⓒ Ⓓ	20. Ⓐ Ⓑ ● Ⓓ	25. Ⓐ ● Ⓒ Ⓓ

Unit B Test

26. ● Ⓑ Ⓒ Ⓓ	31. ● Ⓑ Ⓒ Ⓓ	36. Ⓐ ● Ⓒ Ⓓ	41. ● Ⓑ Ⓒ Ⓓ	46. Ⓐ ● Ⓒ Ⓓ
27. ● Ⓑ Ⓒ Ⓓ	32. Ⓐ Ⓑ ● Ⓓ	37. ● Ⓑ Ⓒ Ⓓ	42. Ⓐ Ⓑ ● Ⓓ	47. ● Ⓑ Ⓒ Ⓓ
28. Ⓐ ● Ⓒ Ⓓ	33. Ⓐ ● Ⓒ Ⓓ	38. Ⓐ ● Ⓒ Ⓓ	43. Ⓐ ● Ⓒ Ⓓ	48. Ⓐ Ⓑ Ⓒ ●
29. Ⓐ ● Ⓒ Ⓓ	34. Ⓐ Ⓑ ● Ⓓ	39. Ⓐ ● Ⓒ Ⓓ	44. ● Ⓑ Ⓒ Ⓓ	49. Ⓐ ● Ⓒ Ⓓ
30. ● Ⓑ Ⓒ Ⓓ	35. Ⓐ ● Ⓒ Ⓓ	40. ● Ⓑ Ⓒ Ⓓ	45. Ⓐ Ⓑ Ⓒ ●	50. Ⓐ Ⓑ ● Ⓓ

Unit C Test

51. Ⓐ Ⓑ ● Ⓓ	56. Ⓐ ● Ⓒ Ⓓ	61. Ⓐ Ⓑ ● Ⓓ	66. ● Ⓑ Ⓒ Ⓓ	71. Ⓐ Ⓑ Ⓒ ●
52. ● Ⓑ Ⓒ Ⓓ	57. Ⓐ Ⓑ ● Ⓓ	62. ● Ⓑ Ⓒ Ⓓ	67. Ⓐ ● Ⓒ Ⓓ	72. Ⓐ Ⓑ ● Ⓓ
53. Ⓐ Ⓑ Ⓒ ●	58. Ⓐ Ⓑ Ⓒ ●	63. Ⓐ ● Ⓒ Ⓓ	68. ● Ⓑ Ⓒ Ⓓ	73. ● Ⓑ Ⓒ Ⓓ
54. Ⓐ Ⓑ ● Ⓓ	59. Ⓐ ● Ⓒ Ⓓ	64. Ⓐ Ⓑ Ⓒ ●	69. Ⓐ Ⓑ ● Ⓓ	74. Ⓐ ● Ⓒ Ⓓ
55. Ⓐ Ⓑ ● Ⓓ	60. Ⓐ ● Ⓒ Ⓓ	65. Ⓐ ● Ⓒ Ⓓ	70. Ⓐ Ⓑ ● Ⓓ	75. ● Ⓑ Ⓒ Ⓓ

Unit D Test

76. Ⓐ Ⓑ Ⓒ ●	81. Ⓐ ● Ⓒ Ⓓ	86. Ⓐ ● Ⓒ Ⓓ	91. ● Ⓑ Ⓒ Ⓓ	96. Ⓐ Ⓑ ● Ⓓ
77. Ⓐ Ⓑ ● Ⓓ	82. Ⓐ ● Ⓒ Ⓓ	87. Ⓐ Ⓑ Ⓒ ●	92. Ⓐ Ⓑ ● Ⓓ	97. Ⓐ Ⓑ ● Ⓓ
78. Ⓐ Ⓑ ● Ⓓ	83. Ⓐ ● Ⓒ Ⓓ	88. Ⓐ Ⓑ ● Ⓓ	93. Ⓐ Ⓑ Ⓒ ●	98. Ⓐ Ⓑ ● Ⓓ
79. Ⓐ ● Ⓒ Ⓓ	84. Ⓐ Ⓑ ● Ⓓ	89. Ⓐ Ⓑ Ⓒ ●	94. Ⓐ Ⓑ Ⓒ ●	99. Ⓐ Ⓑ ● Ⓓ
80. ● Ⓑ Ⓒ Ⓓ	85. Ⓐ Ⓑ Ⓒ ●	90. Ⓐ ● Ⓒ Ⓓ	95. Ⓐ Ⓑ ● Ⓓ	100. Ⓐ ● Ⓒ Ⓓ

Date _____

ISAT Test Prep, Unit A: Item Analysis

For each student, mark test items missed. At the right, record each student's score.

Student	Test Item →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Science Performance Descriptors →	Stage G, 12A.1	Stage F, 12A.1	Stage E, 12A.1	Stage E, 12A.1	Stage E, 12B.1	Stage E, 12B.1	Stage E, 12A.1	Stage G, 12A.1	Stage G, 12A.6	Stage E, 11A.1	Stage E, 11A.6	Stage G, 12A.1	Stage G, 12A.1	Stage F, 12A.1	Stage G, 12B.1	Stage E, 12A.1	Stage E, 12B.1	Stage F, 12B.1
	Sample →					X	X												
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			

Stage F, 12A.1	Stage G, 12A.1	Stage F, 12A.1	Stage F, 11A.1	Stage G, 11A.2	Stage G, 11A.3	Stage G, 12A.1	Total Score (Possible Score = 25 points)
19	20	21	22	23	24	25	
X					X		21

Notes

Date _____

ISAT Test Prep, Unit B: Item Analysis

For each student, mark test items missed. At the right, record each student's score.

Student	Test Item →	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	Science Performance Descriptors →	Stage F, 12E.2	Stage E, 12F.1	Stage G, 12E.1	Stage F, 12E.1	Stage G, 12E.1	Stage G, 12E.3	Stage E, 12E.1	Stage F 12E.1	Stage F, 13A.2	Stage E, 12E.3	Stage E, 11A.6	Stage G, 11A.4	Stage G, 12E.3	Stage F, 12E.1	Stage G, 11A.1	Stage G, 11A.2	Stage G, 11A.3	Stage G, 11A.4
	Sample →					X	X												
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			

Stage E, 12B.2	Stage G, 12E.1	Stage E, 12E.3	Stage E 12E.2	Stage E, 11A.6	Stage F 12E.2	Stage F 12E.2	Total Score (Possible Score = 25 points)
44	45	46	47	48	49	50	
X					X		21

Notes

Date _____

ISAT Test Prep, Unit C: Item Analysis

For each student, mark test items missed. At the right, record each student's score.

Student	Test Item →	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
	Science Performance Descriptors →	Stage F, 12D.2	Stage E, 12C.1	Stage E, 12C.1	Stage E, 12C.1	Stage G, 12C.3	Stage G, 12C.2	Stage G, 12C.1	Stage F, 12C.2	Stage G, 12C.1	Stage F, 12C.1	Stage E, 12D.1	Stage E, 12D.1	Stage E, 12C.2	Stage G, 12D.2	Stage G, 12D.3	Stage G, 11A.3	Stage F, 12C.1	Stage G, 12C.1
	Sample →					X	X												
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			

Stage F, 12D.2	Stage G, 12C.1	Stage G, 12D.2	Stage G, 11A.4	Stage E, 11A.4	Stage G, 11A.2	Stage G, 11A.4	Total Score (Possible Score = 25 points)
69	70	71	72	73	74	75	
X					X		21

Notes

Date _____

ISAT Test Prep, Unit D: Item Analysis

For each student, mark test items missed. At the right, record each student's score.

Student	Test Item →	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
	Science Performance Descriptors →	Stage E, 12F.1	Stage G, 12F.1	Stage F, 12F.2	Stage E, 11A.6	Stage G, 12F.1	Stage E, 12F.1	Stage E, 12F.1	Stage E, 12F.1	Stage E, 12F.1	Stage E, 12F.2	Stage E, 12F.1	Stage F, 12F.1	Stage F, 13A.1	Stage G, 13B.1	Stage F, 12F.2	Stage G, 12F.2	Stage E, 12F.1	Stage E, 12F.1	Stage E, 11A.5
	Sample →					X	X												
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			

Stage G, 12F.2	Stage E, 11A.4	Stage G, 11A.2	Stage E, 13B.2	Stage F, 12F.2	Stage G, 12F.1	Stage G, 12F.1	Total Score (Possible Score = 25 points)
94	95	96	97	98	99	100	
X					X		21

Notes

ISAT Test Prep

Illinois Learning Standards: Science Performance Descriptors, Grade 6

Stage E

11A—Students who meet the standard know and apply the concepts, principles, and processes of scientific inquiry.

1. Construct an inquiry hypothesis that can be investigated researching pertinent context, proposing the logical sequence of steps, securing the appropriate materials and equipment, or determining data-collection strategies and format for approved investigation.
2. Conduct scientific inquiry investigation observing safety precautions and following procedural steps accurately over multiple trials.
3. Collect qualitative and quantitative data from investigation using available technologies, determining the necessary required precision, or validating data for accuracy.
4. Organize and display data determining most appropriate visualization strategies for collected data, or using graphs (i.e., double bar, double line, stem and leaf plots) and technologies.
5. Analyze data to produce reasonable explanations comparing and summarizing data from multiple trials, interpreting trends, evaluating conflicting data, or determining sources of error.
6. Communicate analysis and conclusions from investigation, interpreting graphs and charts, preparing oral, and/or written conclusions for peer review, or generating additional questions that can be tested.

11B—Students who meet the standard know and apply the concepts, principles, and processes of technological design.

1. Identify an innovative technological design from ordinary surroundings or circumstances brainstorming common design questions (e.g., how to squeeze toothpaste better, how to fly a better paper airplane), researching background information, or suggesting the appropriate materials, equipment, data-collection strategies and success factors for approved investigation.
2. Construct selected technological innovation sketching design, proposing the logical sequence of steps for construction, collecting appropriate materials, supplies, and safety equipment, or completing assembly of innovation.
3. Test prototype conducting multiple trials, collecting reliable and precise data, or recording observations.
4. Analyze data comparing and summarizing data, interpreting trends, evaluating conflicting data, or determining sources of error.
5. Communicate design findings selecting graphs and charts that effectively report the data, preparing oral and written investigation conclusions, or generating alternative design modifications which can be tested from original investigated question.

12A—Students who meet the standard know and apply concepts that explain how living things function, adapt, and change.

1. Apply scientific inquiries or technological designs to explore the patterns of change and stability at the micro- and macroscopic levels of organisms (including humans), comparing the stages of simple life cycles and energy requirements, or identifying structures and their functions in cells, tissues, organs, systems and organisms (including humans).
2. Apply scientific inquiries or technological designs to distinguish the similarities and differences of offspring in organisms (including humans), comparing specific characteristics of offspring with their parents, or predicting possible genetic combinations from selected parental characteristics.
3. Apply scientific inquiries or technological designs to examine the nature of inheritance in structural and functional features of organisms (including humans), describing genetic and environmental influences on the features of organisms, distinguishing between inherited and acquired characteristics, or explaining how cells respond to genetic and environmental influences.
4. Apply scientific inquiries or technological designs to examine the nature of learned behavior or responses in all organisms (including humans), distinguishing characteristics as learned or inherited, or conducting simple surveys relating to learned behaviors of classmates, and/or family members.

12B—Students who meet the standard know and apply concepts that describe how living things interact with each other and with their environment.

1. Apply scientific inquiries or technological designs to categorize organisms (including humans) by their energy relationships in their environments, classifying organisms by their position in a food web, grouping organisms according to their adaptive internal and/or external features, contrasting food webs within and among different biomes, identifying the biotic and abiotic factors associated with specific habitats, or making simple inferences to the closed systems of other planets.
2. Apply scientific inquiries or technological designs to explain competitive, adaptive and survival potential of species in different local or global ecosystems, identifying survival characteristics of organisms, explaining abiotic or biotic factors which threaten health or survival of populations or species (including humans), or identifying theories explaining mass extinctions.

12C—Students who meet the standard know and apply concepts that describe properties of matter and energy and the interactions between them.

1. Apply scientific inquiries or technological designs to explore energy, demonstrating how mirrors, prisms, diffraction gratings and filters direct light patterns, diagramming how electricity can be produced from different sources of energy, explaining how electrical energy can be converted to light, heat, sound, and magnetic energy, analyzing common examples of potential and kinetic energy, or comparing insulation, conduction, convection, and radiation of heat.
2. Apply scientific inquiries or technological designs to distinguish the properties of matter, separating components of mixtures by solubility, magnetic properties and densities, analyzing compound samples by quantitative methods, graphing the temperature variations associated with phase changes of simple substances, or categorizing the properties of common elements into a graphic format.

12D—Students who meet the standard know and apply concepts that describe force and motion and the principles that explain them.

1. Apply scientific inquiries or technological designs to explore constant, variable and periodic motion, tracing and measuring motion of vehicles (e.g., cars, bicycles, skates) in terms of position, direction, acceleration and speed in straight line, circular and inclined paths, introducing the concepts of

harmonic and oscillating motion in everyday examples, or applying the concepts of natural frequency.
2. Apply scientific inquiries or technological designs to analyze actions and reactions, examining initial and final forces, manipulating simple direct and inverse proportions to forces, explaining thrust, weight, lift and drag in flight, analyzing gears and gear ratios to do work, or demonstrating Newton's Laws of Motion in terms of space flight.

12E—Students who meet the standard know and apply concepts that describe the features and processes of Earth and its resources.
1. Apply scientific inquiries or technological designs to analyze global topographic features modeling the effect of glaciation on a surface with applications to Illinois topography, or using satellite pictures, various topographic and thematic maps to indicate demographic, economic and weather patterns, and/or their interrelationships to each other.
2. Apply scientific inquiries or technological designs to analyze weather and climatic conditions, comparing historic and current precipitation, barometric, and temperature records, and trends, projecting future trends based on past and current records, or making inferences about cloud formations and weather conditions.
3. Apply scientific inquiries or technological designs to examine long-term global, national and local renewable and nonrenewable resource supplies, explaining how historic economic choices have affected resource supplies, or focusing on comparative historic and projected water supplies and demands such as those for the local community, Illinois, the nation, and/or the world.

12F—Students who meet the standard know and apply concepts that explain the composition and structure of the universe and Earth's place in it.
1. Apply scientific inquiries or technological designs to introduce concepts that explain planetary, interplanetary and stellar characteristics and cycles, generalizing the composition and features of the inner and outer planets, asteroids, comets, and different star types, applying orbital concepts for seasonal positions of constellations, applying apparent motions in the sky to use the sky as a clock, compass or calendar, explaining how the planets change their position in the sky relative to the stars over time using varying astronomic images.
2. Apply scientific inquiries or technological designs to introduce the concepts of gravitation in the solar system and beyond, identifying the general applications of gravitational forces on Earth and in near and far space examples, explaining continuous free fall in space flight, or applying solar system cycles to trajectories in space flight and research.

13A—Students who meet the standard know and apply accepted practices of science.
1. Apply appropriate principles of safety wearing appropriate safety gear during inquiry or design investigations, demonstrating how to use a fire extinguisher, identifying safety procedures for preparation, process and conclusion of science investigations to minimize safety hazards, or recognizing potential poisonous plants or substances in classroom, outdoor or home settings, or role-playing safe reactions to safety crisis situations.
2. Apply scientific habits of mind explaining why similar investigations should but may not produce similar results, identifying circumstances which distort how variables interact, labeling accurate observations fully and carefully, or generating questions and strategies to test science concepts using critical and creative thinking.

13B—Students who meet the standard know and apply concepts that describe the interaction between science, technology, and society.
1. Apply scientific technologies collecting, storing, retrieving, and communicating data in classroom research and investigations, or researching the progression of technological advances in pure and applied scientific investigations and innovations.
2. Investigate the interactions of technology in science and societal situations displaying graphically the improvements and their impact in local and global agriculture, transportation, health, sanitation, engineering, and manufacturing settings over time, or explaining different perceptions about discoveries, innovations, and trends in places, events, and regions.
3. Investigate the interactions of societal decisions in science and technology innovations and discoveries exploring the family, local, national, or global impact of them, examining conceptual, mathematical and policy implications of energy conservation programs for classrooms, schools, homes and communities, or describing the changes in tools, careers, resource use and productivity over the centuries.

Stage F

11A—Students who meet the standard know and apply the concepts, principles, and processes of scientific inquiry.
1. Formulate hypotheses generating if-then, cause-effect statements and predictions, or choosing and explaining selection of the controlled variables.
2. Design and conduct scientific investigation, incorporating appropriate safety precautions, available technology and equipment, researching historic and current foundations for similar studies, or replicating all processes in multiple trials.
3. Collect and organize data accurately, using consistent measuring and recording techniques with necessary precision, using appropriate metric units, documenting data accurately from collecting instruments, or graphing data appropriately.
4. Interpret and represent results of analysis to produce findings, differentiating observations that support or refute a hypothesis, identifying the unexpected data within the data set, or proposing explanations for discrepancies in the data set.
5. Report the process and results of an investigation, using available technologies for presentations, distinguishing observations that support the original hypothesis, analyzing a logical proof or explanation of findings, or generating additional questions which address procedures, similarities, discrepancies or conclusions for further investigations.

11B—Students who meet the standard know and apply the concepts, principles, and processes of technological design.
1. Formulate proposals for technological designs which model or test scientific principles, generating investigation ideas to apply curricular science principles (e.g., how to test phase changes of substances or acceleration in free fall, or effect of ice/glaciers on rocks), brainstorming pertinent variables, researching historic designs, or conducting peer review and choice for design and criteria selection.
2. Plan and construct technological design, incorporating the safety and procedural guidelines into the construction plan, or maximizing resource capabilities.
3. Collect and record data accurately using consistent metric measuring and recording techniques with necessary precision, or documenting data from collecting instruments accurately in selected format.
4. Interpret and represent results of analysis to produce findings, comparing data sets for supporting or refuting scientific principle, evaluating multiple criteria for overall design success, or proposing explanations for sources of error in the data set for process or product design flaws.
5. Communicate the results of design investigation presenting an oral and/or written report, explaining the test of the scientific principle, using available technologies, relating anecdotal and quantitative observations, or generating additional design modifications which can be tested later.

12A—Students who meet the standard know and apply concepts that explain how living things function, adapt, and change.
1. Apply scientific inquiries or technological designs to examine the cellular unit recognizing how cells function independently to keep the organism alive at the single cell level and

dependently at specialized levels, or comparing the metabolic and reproductive processes, structures and functions of single and multi-cellular organisms, to examine the patterns of change and stability over time, investigating the development of organisms and their environmental adaptations over broad time periods, or comparing the physical characteristics of two to three generations of familial characteristics.

2. Apply scientific inquiries or technological designs to explore the basic roles of genes and chromosomes in transmitting traits over generations, describing how physical traits are transmitted through sexual or asexual reproductive processes, charting 'pedigree' probabilities for transmissions, identifying examples of selective breeding for particular traits, or analyzing how familiar human diseases are related to genetic mutations.
3. Apply scientific inquiries or technological designs to examine stimulus-response reactions in organisms, comparing growth responses in plants, comparing simple locomotive or metabolic responses in simple or complex life forms.

12B—Students who meet the standard know and apply concepts that describe how living things interact with each other and with their environment.

1. Apply scientific inquiries or technological designs to study the impact of multiple factors that affect organisms in a habitat, describing how behaviors are influenced by internal and external factors, sketching the interrelationships among/between the land, water and air components to life in the system, predicting the consequences of the disruption of a food pyramid, identifying the interrelationships and variables that affect population sizes and behaviors, or identifying different niches and relationships found among organisms in an Illinois habitat.
2. Apply scientific inquiries or technological designs to apply the competitive, adaptive and survival potential of organisms, describing how fossils are used to determine patterns of evolution, observing how plant and animal characteristics help organisms survive in their environments, or analyzing how environmental factors threaten or enhance the survival potential of populations.

12C—Students who meet the standard know and apply concepts that describe properties of matter and energy and the interactions between them.

1. Apply scientific inquiries or technological designs to demonstrate the interactions of energy forms explaining how interactions of matter and energy affect the changes of state, tracing electrical current in simple direct and alternating circuits, or diagramming how sound, heat and light energy forms are detected by humans and other organisms.
2. Apply scientific inquiries or technological designs to explore the basic structure of matter illustrating the structure of elements and simple compounds, measuring the masses of chemical reactants and products to show that the sum equals the parts, investigating the compressibility and expansion of gases at colder and hotter temperatures, or analyzing the electrical nature of charges, attraction, and repulsion.

12D—Students who meet the standard know and apply concepts that describe force and motion and the principles that explain them.

1. Apply scientific inquiries or technological designs to examine gravitational forces, correlating how an object's mass and distances affect weight in Earth and planetary examples, identifying the effects of the Sun's gravitational force in the solar system, or predicting direct and inverse proportional trends from data of gravitational attraction.
2. Apply scientific inquiries or technological designs to incorporate the impact of force on motion, associating Newton's three laws of motion to mass, distance, and acceleration, making metric mathematical calculations of average speed, velocity, and acceleration, or comparing resistance and friction factors in electrical, magnetic, fluid, and physical systems.

12E—Students who meet the standard know and apply concepts that describe the features and processes of Earth and its resources.

1. Apply scientific inquiries or technological designs to examine the large-scale dynamic forces, events and processes that affect Earth's land and populations, demonstrating tectonic movements related to earthquakes, tsunamis and volcanoes, or researching past, current and projected Earth system phenomena that affect populations.
2. Apply scientific inquiries or technological designs to examine the large-scale dynamic forces, events and processes that affect Earth's water/atmospheric systems and populations, researching hurricane paths, global temperature trends, ocean temperatures and their effects on populations, researching past, current and projected Earth system phenomena that affect populations, or exploring the concepts associated with the 'greenhouse effect' on Earth.
3. Apply scientific inquiries or technological designs to relate various pollution and resource relationships, examining community and national policies for regulating recycling, pollution, and production of resources, or evaluating biodegradability of natural and synthetic materials according to composition and risk/benefits.

12F—Students who meet the standard know and apply concepts that explain the composition and structure of the universe and Earth's place in it.

1. Apply scientific inquiries or technological designs to analyze the solar system and planetary characteristics, comparing gravitational, atmospheric, compositional, and energy factors necessary for planetary habitation, describing evidence for presence of water beyond Earth, or predicting factors and materials necessary for interplanetary travel and study.
2. Apply scientific inquiries or technological designs to examine the features of the universe introducing the calculations associated with the scale of the universe in terms of the speed of light, describing the star groupings according to masses, color, apparent color, distances and brightness, identifying these characteristics about our star and its layers, or comparing the capabilities of different kinds of telescopes and imaging technologies.

13A—Students who meet the standard know and apply accepted practices of science.

1. Apply appropriate principles of safety, outlining safety precautions, clean-up and disposal procedures, as well as specimen care and handling for inquiry or design investigations, role-playing responses for individual or group reactions in threatening weather, hazardous chemical contamination, or other unsafe situations, or conducting safety tests or surveys about potential safety hazards in the classroom, school building, or home.
2. Apply scientific habits of mind, generating questions and strategies to test science concepts using critical and creative thinking, researching historic examples of valid and faulty hypothesis generation and investigations, contrasting the scientific methods of observational and experimental investigations, or proposing how and why more than one possible conclusion should be considered and can be drawn from scientific investigations.
3. Analyze cases of scientific studies, studying historic examples of valid inquiry investigations associated with the life, environmental, physical, earth and space sciences, contrasting faulty studies with deviations from established scientific methods, contrasting the scientific methods between observational, remote and experimental investigations, or suggesting how societal influences have affected scientific inquiry positively and negatively.

13B—Students who meet the standard know and apply concepts that describe the interaction between science, technology, and society.

1. Apply scientific technologies, incorporating technology and probe ware into classroom research, investigations,

and contextual studies, or projecting possible technological advances in the near and long-term future.
2. Research the interactions of technology in science and societal situations, explaining ways that ecosystems have been changed as results of technological innovations, inferring technological impact in published medical, economic, and population statistics (e.g., birth/death rates, disease transmission), or explaining how changes in transportation, communication, production, and other technologies affect the location of economic activities.
3. Analyze the societal interactions resulting from scientific discoveries and technological innovations, researching the scientific milestones that have revolutionized thinking over time, grouping technological innovations to historic time periods and changes in communities and countries, or comparing public perceptions about the costs and impact of pure science research and applied science solutions.

Stage G

11A—Students who meet the standard know and apply the concepts, principles, and processes of scientific inquiry.
1. Formulate contextual hypotheses generating an if-then, cause-effect premise, differentiating qualitative and quantitative data and their applicability, using conceptual/mathematical/physical models, or previewing existing research as primary reading sources.
2. Design inquiry investigation which addresses proposed hypothesis, determining choice of variables, preparing data-collecting format, or incorporating all procedural and safety precautions, materials and equipment handling directions.
3. Conduct inquiry investigation choosing applicable metric units of measurement with estimated scale and range of results for student-generated data tables, using direct, indirect, or remote technologies for observing and measuring, conducting sufficient multiple trials, or recording all necessary data and observations objectively.
4. Interpret and represent analysis of results to produce findings, observing trends within data sets, evaluating data sets to explore explanations of outliers or sources of error, or analyzing observations and data which may support or refute inquiry hypothesis,
5. Report and display the process and findings of inquiry investigation, presenting oral or written final report for peer review, generating further questions for alternative investigations or procedural refinements, or evaluating other investigations for consolidation/refinement of procedures or data explanation.

11B—Students who meet the standard know and apply the concepts, principles, and processes of technological design.
1. Identify an important historic innovation or model of a technological design, examining inventions or entrepreneurial events driven by science or engineering principles, searching pertinent historical foundation, or determining the success criteria, design constraints, and testing logistics that were encountered.
2. Construct selected technological innovation model, sketching a progression of design stages and prototypes, proposing the logical sequence of steps in design construction, identifying original and comparable simulation materials for construction, predicting proportional scale for actual parameters and materials, or completing assembly of innovation model.
3. Test prototype predicting proportional scale for actual parameters and materials, conducting multiple trials according to success criteria, scale, and design constraints, or recording reliable and precise data and anecdotal observations.
4. Analyze data to evaluate design, comparing and summarizing data from multiple model trials, or correlating historic conditions and data to model testing.
5. Communicate design evaluation report, presenting oral and written report on historical significance of selected technological design and tested model, its original constraints and conditions, or generating possible alternative designs which could have been considered historically.

12A—Students who meet the standard know and apply concepts that explain how living things function, adapt, and change.
1. Apply scientific inquiries or technological designs to examine the cellular-to-organism interrelationships, comparing the increasingly complex structure and function of cells, tissues, organs and organ systems, demonstrating the processes for biological classification, analyzing normal and abnormal growth and health in organisms (with a focus on humans), describing how physiological systems carry out vital functions (e.g., respiration, digestion, reproduction, photosynthesis, excretion, and temperature regulation).
2. Apply scientific inquiries or technological designs to examine macro- and micro-evolution in organisms, comparing and assessing changes in the features or forms of organisms over broad time periods to their adaptive functions and competitive advantages, describing how natural selection accounts for diversity of species over many generations.
3. Apply scientific inquiries or technological designs to explore the science of genetics, tracing the history of genetics, correlating the principles of genetics to mitotic cell division and simple mathematical probabilities, researching applied genetics in plant and animal breeding, or associating genetic factors for inheritance in humans, including genetic disorders.
4. Apply scientific inquiries or technological designs to examine the cellular coordination of responses, describing how the nervous system communicates between cells within the whole organism, tracing stimulus-response paths in various nervous systems, or analyzing the effect of substances (e.g., oxygen, food, blood, hormones, drugs) circulating through the body.

12B—Students who meet the standard know and apply concepts that describe how living things interact with each other and with their environment.
1. Apply scientific inquiries or technological design to examine the energy requirements of ecosystems, tracing the roles and population ratios of producers, consumers, and decomposers in food chains and webs, or identifying the biomass relationship with the transfer of energy from the sun to final consumers.
2. Apply scientific inquiries or technological designs to relate the chemical cycles in ecosystems, modeling the water, carbon, and nitrogen cycles with local references, or researching groundwater resources and potential sources of contamination with local examples.
   Apply scientific inquiries or technological designs to explore the interactions between an ecosystem's organisms, examining types of interactive relationships (e.g., mutualism, predation, parasitism) with specific examples, or explaining interrelationship of adaptations and ecosystem survival.
3. Apply scientific inquiries or technological designs to introduce population dynamics in ecosystems, exploring models of population growth rates, determining factors that limit population growth, or researching specific instances of population explosions over time.
4. Apply scientific inquiries or technological designs to model global biomes, identifying the general climate, soil, and inhabitant of the six major land-based biomes, mapping the global biomes, or comparing the graphical meteorological data (temperature, precipitation) of biomes/ecosystems.

12C—Students who meet the standard know and apply concepts that describe properties of matter and energy and the interactions between them.
1. Apply scientific inquiries or technological designs to compare heat, light, and sound energies, distinguishing heat and temperature, their measurements, and the relationship to mass, recording temperatures of simple substances collected during melting/freezing or boiling/condensing to trace phase changes, identifying ways of production and travel for heat, light, and sound in various media, or relating sound reflection, loudness, frequency, and pitch in common examples.

2. Apply scientific inquiries or technological designs to explore the nature of energy conversions and conservation, describing energy and its different forms with common examples, categorizing energy into kinetic and potential states, explaining energy conversion and conservation possibilities, or introducing the connections to concepts of force, momentum, power, and motion.
3. Apply scientific inquiries or technological designs to explore the basic structure of matter measuring mass and volumes of common solids (regular and irregular) and liquids to introduce density ratios, comparing ratios of different masses and different volumes of the same kinds of samples, relating how historic models of elemental matter from ancient Greeks to medieval alchemists evolved to current representations and explanations, classifying comparable properties of representative elements or similar compounds (mixtures, acids, bases, salts, metals, non-metals), or constructing simple chemical structure models to explain chemical combinations, states, and properties.

12D—Students who meet the standard know and apply concepts that describe force and motion and the principles that explain them.

1. Apply scientific inquiries or technological designs to explore frames of reference for measuring motion, visualizing the possible reference frames in multiple motion examples, or comparing scope of motion (straight line, projectile, inclined, free fall, circular) of various objects.
2. Apply scientific inquiries or technological designs to measure motion, explaining the dimensions of speed/time with directional units, comparing speed, average speed, velocity, acceleration, and momentum with common examples, using simple machines to demonstrate the principles of mechanics, or analyzing components of motion graphically.
3. Apply scientific inquiries or technological designs to measure force, explaining the dimensions of force graphically, comparing common examples of balanced or unbalanced forces in everyday use, or examining frictional forces in common examples.
4. Apply scientific inquiries or technological designs to explore laws and theories associated with motion, comparing common situations to each of Newton's three laws of motion, using the appropriate units, introducing applications to Newton's Law of Universal Gravitation, or incorporating the variant of air resistance.

12E—Students who meet the standard know and apply concepts that describe the features and processes of Earth and its resources.

1. Apply scientific inquiries and technological design to investigate large-scale dynamic forces that change geologic features, diagramming single global features over time as affected by continental drift, identifying properties and origins of rocks and minerals, or explaining impact of weathering, erosion, and deposition.
2. Apply scientific inquiries or technological designs to investigate large-scale meteorological forces distinguishing weather from climate, examining global weather data over broad periods of time, or explaining how atmospheric circulation is driven by solar heating.
3. Apply scientific inquiries or technological designs to investigate large-scale oceanographic forces, mapping ocean motions and life zones, identifying the quantitative proportions of ocean and fresh water.

12F—Students who meet the standard know and apply concepts that explain the composition and structure of the universe and Earth's place in it.

1. Apply scientific inquiries or technological designs to explore the earth in space with its moon, plotting how the relative motions and positions of the sun, earth, and moon influence eclipses, moon phases, and tides, comparing the composition and surface features of the earth and moon, using imaging, magnifications and displays to model the moon's surface features, or calculating earth and moon rise and set over time.
2. Apply scientific designs to explore the solar system, comparing the major features of the solar system including the nine planets, their moons, orbital shapes, surface and atmospheric conditions, orientation and periods of rotation and revolution, charting orbital factors of comets, asteroids, meteors, etc., or explaining imaging displays of different kinds of solar system objects.
3. Apply scientific inquiries or technological designs to study the galaxies, describing the relationship of galactic components (e.g., age, composition, properties), or explaining imaging displays of views of galactic objects.
4. Apply scientific inquiries or technological designs to study space exploration, creating a timeline which denotes the important events associated with the global space programs, identifying the kinds of technologies which are currently used for studying the solar system and universe, or reporting on applicable historic studies which have provided discoveries, tools or explanations associated with space exploration.

13A—Students who meet the standard know and apply accepted practices of science.

1. Apply appropriate principles of safety, identifying potentially hazardous chemical combinations in the home or classroom, suggesting responses and reactions in home and classroom settings in case of threatening chemical scenarios, following all necessary safety precautions, cleaning and disposal procedures for scientific investigations, demonstrating safe transport, precise use, and appropriate storage for scientific equipment, or providing safe and ethical care for all classroom organism collections.
2. Apply scientific habits of mind, generating questions and strategies to test science concepts using critical and creative thinking, identifying instances of how scientific reasoning, insight, skill, creativity, intellectual honesty, tolerance of ambiguity, skepticism, persistence, and openness to new ideas have been integral to scientific discoveries and technological improvements, or comparing scientist's work and habits of mind to work in other careers.
3. Analyze cases of scientific studies, studying historic examples of valid investigations from curricular life, environmental, physical, earth, and space sciences, finding examples of faulty or biased scientific reasoning which distorted scientific understanding, or citing experimental and observational strategies in direct, indirect, and remote investigations.

13B—Students who meet the standard know and apply concepts that describe the interaction between science, technology, and society.

1. Explore scientific technologies in life, environmental, physical, earth, and space sciences, identifying advances in the past century, describing technologies used by scientists to forecast, explain, or test major events in each of the sciences, or diagramming processes and products from applicable technologies.
2. Explore the interactions of science and technology in multicultural, societal, and economic settings, analyzing how the introduction of a new technology has affected human activities worldwide, or associating personal biographic information about science leaders from around the world.
3. Explore historic, multicultural societal influences on scientific discoveries and technological innovations, comparing the knowledge, skills, and methods of early and modern scientists in the sciences, or finding examples of rejection of scientific or technological advances by cultures based on belief systems.
4. Explore scientific concepts in career and technical knowledge and skills in everyday settings, interviewing adults to identify specific applications of scientific concepts or technological innovations, researching job market trends for anticipated changes in the next ten-year period based on projected technology interventions, resource depletion or access, or economic interactions, or demonstrating relationships between improving technology, all science fields, and educational/training requirements for such careers.

PEARSON
Scott Foresman
scottforesman.com

ISBN 0-328-14756-7
9 780328 147564 90000

T2-AWK-548